High Strength Structures by Carbon Nanotube Resonant Excitation

Completed Technology Project (2015 - 2016)

Project Introduction

The objective of this project is to explore approaches to activate CNTs to draw in molecular species that induce bond formation to bridge the tubes. Besides having very attractive mechanical properties, CNTs also have excellent electrical and thermal properties. These properties lend themselves to coupling with energy sources so it is possible to precisely target site activation on the CNT surface to promote the introduction of molecular species that can form bonds between the tubes which enable load transfer between tubes. By this mechanism, short, discontinuous tubes can function as continuous load carrying members. The set of energetic sources that will be examined include microwaves, inductive heating, resistive heating, infrared, ultrasonic, electromechanical and resonant wavelength laser heating. Deliverables for FY 16 will include survey of the methods listed above, focused on parameters required to couple with CNTs. Computational modeling will be used to guide the prioritization of experimental methods that yield the greatest promise in achieving the objective. of bridging CNT bundles.

Anticipated Benefits

N/A

Primary U.S. Work Locations and Key Partners

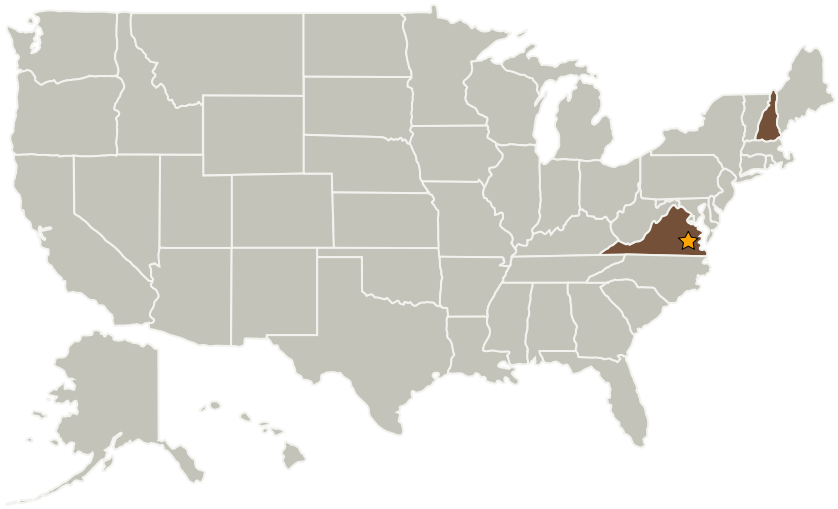

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Table of Contents

Center Innovation Fund: LaRC CIF

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Nanocomp Technologies	Supporting Organization	Industry	
National Institute of Aerospace	Supporting Organization	Academia	Hampton, Virginia

Primary U.S. Work Locations	
New Hampshire	Virginia

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Center Innovation Fund: LaRC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

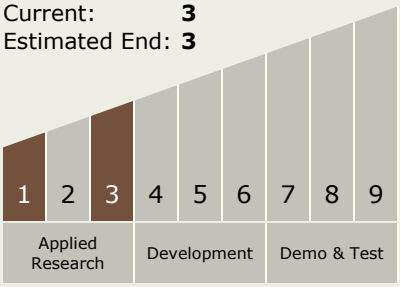
Julie A Williams-byrd

Principal Investigator:

Emilie J Siochi

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.3 Electromagnetic

Target Destination

Earth